

## CLAIMS

What is claimed is:

1. A method for manufacturing a semiconductor device, comprising:
  - forming a trench in a surface region of a semiconductor substrate, of a first conductivity type;
  - forming a drift region, of a second conductivity type, around the trench;
  - forming a gate insulating film, having a uniform thickness, along a side surface and a bottom surface of the trench and inside the trench;
  - forming a first conductor along a surface of the gate insulating film
  - etching back the first conductor in an active region so that the first conductor remains only in side surface regions of the trench;
  - forming a base region of, the first conductivity type, and a source region, of said second conductivity type, in a surface region of the semiconductor substrate outside the trench;
  - forming an interlayer dielectric inside said first conductor;
  - selectively removing a bottom of the interlayer dielectric in the active region;
  - forming a drain region of, the second conductivity type, at the bottom of the trench; and
  - forming a second conductor in the trench, the second conductor electrically connecting to the drain region.
2. The method for manufacturing a semiconductor device of claim 1, further comprising:
  - forming an interlayer dielectric on a surface of the semiconductor substrate;
  - opening contact holes through the interlayer dielectric;
  - forming a gate electrode that electrically connects to the first conductor, a drain electrode that electrically connects to the second conductor, and a source electrode that electrically connects to the source region.
3. The method for manufacturing a semiconductor device of claim 1, wherein the etching back of the first conductor includes over-etching the first conductor so that only a portion of the first conductor lower than the surface of the semiconductor substrate remains un-removed.

4. The method for manufacturing a semiconductor device of claim 2, wherein the etching back of the first conductor includes over-etching the first conductor so that only a portion of the first conductor lower than the surface of the semiconductor substrate remains unremoved.